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4 October 1982

Worldwide Report

ENVIRONMENTAL QUALITY

No. 371

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PAST REGIME'S FORESTRY POLICY CALLED 'VANDALISM'

Dacca THE NEW NATION in English 8 Sep 82 p 5

[Text]

The unplanned and reckless destruction of trees under the past regime, unaccompanied by proportionate planting of them almost assumed vandalistic proportions leading to gradual depletion of this valuable resource and serious ecological imbalances. According to expert opinion, a developing country should have one fourth of its total area under forests for maintaining its ecological balance and meeting the demands of economic development. But the percentage in our country has already dwindled to only 9.2, while lack of proper planning in afforestation and wanton destruction of forest resources make the future prospects gloomier still. According to available statistics, we have 5 crore 95 lakh square feet of timber and 10 crore sqr. feet of firewood, as against a demand of 3 crore 30 lakh sqr. feet of timber and 17 crore sqr. feet of firewood—which means a short-fall of 75 lakh sqr. feet of timber and 7 crore sqr. feet of firewood. The demand is likely to be more than doubled in the next 20 years.

A recent newspaper report depicts a grim picture of reckless cutting of trees in Magura Sub-division of Jessore The picture is hardly different in other parts of the country. Trees are being used not only as fuel for cooking purposes but also in the brick kilns on a larger scale.

The only answer to the slow process of aridisation and desertification, which is already manifesting itself in many parts of the country, particularly of the northern districts, and the way of averting a veritable disaster on the ecological and, ipse facto, economical front is planned afforestation on the one hand and making more extensive uses of alternative fuels like gas and coal on the other. But unfortunately we are lagging behind or at best moving very slowly on both these counts. It is time we gave the problem the serious consideration it deserves.

ZEAL URGED IN IMPLEMENTATION OF FOREST POLICY

Madras THE HINDU in English 16 Aug 82 p 8

[Editorial]

[Text]

THE NEW NATIONAL forest policy, whose broad contours the Central Board of Forestry endorsed last week, assigns primacy to environmental preservation among its various objectives. That derivation of economic benefits is pushed to the second place is indicative of the Government of India's awareness of the necessity of maintaining eco-culture. Declaration of intent, however, means nothing, unless it is backed by a strong will and determined effort to carry it out (as evidenced by the fate that has befallen the policy enunciated in 1952). That the forest area has dwindled in extent by 4.3 million hectares between then and 1979 is a sad commentary on the way successive Governments have been "pursuing" the policy that proclaimed forestry's intrinsic right to land and aimed at extending the forest cover from 23 to 33 per cent of the total geographical area. Mindless destruction of natural forests — often by unscrupulous elements with the connivance of corrupt officials, and, sometimes, by well-meaning but misguided leaders in power who are under the illusion they are promoting economic growth — has been going on virtually unchecked to the detriment of the ecological balance. Geologists blame the denudation of verdant forests for the Nilgiris' increasing proneness to landslips — as many as 200 landslips occurred there in 1979.

Whether it is conservation, of which prevention of criminal interference is an important aspect, or afforestation, the results vary with the levels of perception and zeal shown by the State Governments, the implementing agencies. Parochial urges and wrong values often account for the violation of the long-term objectives of preserving nature's harmony. In a 1976 study, the National Commission on Agriculture found most States apathetic to the goals set as national policy. The comprehensive changes contemplated to the Indian Forest Act of 1927 may contribute to better discipline in forest management and help correct disparities in law between State and State. However, any attempt to make the law tight to the point of divesting the States of authority completely — to which a Tamil Nadu Minister, Mr. R. M. Veerappan, referred at the Central Board meeting — will prove counterproductive. By a judicious use of both the carrot and the stick — the latter only in extreme cases such as the Silent Valley dispute where the State refuses to see reason — the Centre can, and should, enlist cooperation and involvement in promoting social forestry and in motivating the people in tree farming on a scale worthy of a big country that has been blessed with nature's gifts in abundance.

CSO: 5000/7085

SCIENTISTS SUGGEST APPROACH TO DEFORESTATION

New Delhi PATRIOT in English 28 Aug 82 p 5

/Text/

A TWO-pronged approach has been suggested by the Indian Institute of Science to check illegal exploitation of forests, reports UNI.

First, the illicit activities of commercial interests should be curbed with strict enforcement of law and, secondly the rural population should be provided with alternative avenues of employment.

In a critical review of Forest Management in India, the Bangalore-based institute says exploitation of forest wealth for commercial interests should be distinguished from the use of forest produce by the rural poor who have traditionally depended on these resources for subsistence.

The disappearance of valuable timber like Rosewood from a large tract of Kerala and Sandalwood from much of Tamilnadu and Karnataka is symptomatic of "the criminal loot of the nation's forest resources which must be halted".

The institute has also recommended stronger legal measures for penalising the officials and politicians involved in illicit exploitation of the forests.

It has suggested that the Government should develop a system on the model of Lok Pals to whom appeals could be made by the citizens against such erring officials and politicians.

The study report of the institute is coming up for discussion at a meeting of the National Committee on Environment Planning, the highest policy planning body on environment.

The study, conducted in the context of a new forest policy now in the making says the basic direction of the policy should be preservation of environment in protecting the remaining natural forests, recreating the tree cover in barren lands and generating productive employment for the rural poor.

The 1982 forest survey of India has revealed that stocking, productivity and natural diversity of only six million hectares of land out of 35 million hectares under forest cover is satisfactory. The rest of the 35 million hectares of the total 70 hectares classified as forest land are treeless.

The institute has appreciated the Gujarat Government's scheme under which subsistence allowance is being paid for 10 to 15 years to the rural people for bringing the degraded forest land under tree cover. They will also receive a share of the net profit on the maturity of the trees.

The study notes that even now, after the disastrous Alaknanda floods of 1970, scientific information is inadequate on the relation between deforestation and landslides in the Himalayas. Decisions on tree fellings in this region are being based merely on political pressures and counter-pressures.

CSO: [illegible]/7097

USE OF TOXIC PESTICIDES INVESTIGATED

Kuala Lumpur NEW STRAITS TIMES in English 17 Aug 82 pp 1, 2

[Text] **KUALA LUMPUR, Mon. — Agriculture Minister Datuk Abdul Manan Othman has directed experts from his Ministry's Plant Protection Department and Mardi to investigate the extent of use of toxic pesticides and chemicals in Cameron Highlands.**

The team of investigators has been asked to evaluate, if possible, the extent of danger to human consumption posed by the usage of chemicals by the highlands' vegetable farmers.

Ministry sources said Datuk Manan had expressed concern over a report that the farmers are using contraband insecticides which are not registered by the Malaysian Pesticides Board.

"Although the Ministry has its field officers stationed in various parts of the country, including Cameron Highlands, the Minister has called for a survey to establish the extent of the situation," they said.

Undue risks

The *New Straits Times* reported early this month that the highlands' farmers are using insecticides smuggled in from Thailand and identified at least two — Lannate and Parathion — which are not registered in Malaysia.

The Ministry sources confirmed that these two poisons had been banned because of the hazards in handling the chemicals. However, they are approved in the United States and Europe with pre-harvest intervals stipulated for the various types of crops.

For instance, in the U.S., farmers using Lannate (methomyl) should stop spraying one day before harvesting cabbages and tomatoes and seven days for cauliflower.

In the case of Parathion, they should observe a pre-harvest interval of seven to 21 days, depending on the crop.

The sources said the Insecticides Board and the Department of Agriculture were aware of the hazards of toxic pesticides. They had subsequently banned chemicals like lead arsenate, sodium arsenite and organo-mercurial compounds which are thought to pose undue risks to those handling the chemicals and those consuming the treated produce.

"In addition, the application for registration of other highly toxic pesticides has also been turned down," they said.

"There are provisions under the Pesticides Act, 1974 and other laws in the country for the control of pesticide residues in food, but due to the lack of laboratory facilities and shortage of trained staff, enforcement of residue limits in food is yet to commence," they added.

Anyone with information on the sale of such illegal pesticides should contact the Pesticides Section, Crop Protection Branch, Department of Agriculture at Jalan Swettenham.

IN Malaysia, the registration of a pesticide is valid for three years but its licence can be withdrawn at any time by the Pesticides Board, where necessary.

The rules on the registration of pesticides under the Pesticides Act were gazetted on Oct. 1, 1976.

Before this, only prohibited pesticides under the Poisons Ordinance, 1952 were banned in Malaysia.

However, since the Act and as from April 1 last year, only registered pesticides are allowed to be imported or manufactured here. As from Jan. 1 this year, it is an offence for shops to sell or store for sale unapproved pesticides.

Before a pesticide is registered, the importers or manufacturers are required to submit information on the pesticide — its chemistry, analysis, toxicology, bio-efficacy, residues and breakdown products and a sample for testing.

NATIONWIDE GROUP TO COUNTER 'MILITANT CONSERVATIONISTS'

[illegible], [illegible]

WELLINGTON: THE EVENING POST, 19 [illegible]

[Text]

Plans are afoot to establish a nationwide pre[illegible] to [illegible] "militant conservationists" and "promote the [illegible] and responsible [illegible] resources."

As many as 300 people representing sawmill[illegible], tractors, local business, mining and farming interests are expected to attend a meeting at Whataroa, south of Hokitika, on Wednesday night to form the as yet unnamed new group.

The initiative has come from the Greymouth Chamber of Commerce, West Coast Futures Incorporated and Save Our South Westland (SOS).

Mr Malcolm MacRae, president of SOS, which was formed after the recent Government decision to include two local native forests in the Westland National Park, said he saw natural allies among Otago people who favoured the Aramoana smelter, people whose livelihoods depended on the hydro-electric development of the Clutha and those who favoured the draining of part of Lake Wairarapa for farming.

He said that although the group's aims may be in sympathy with objectives of business concerns, the group was being formed by ordinary people who were worried that the lobbying of militant conservationists was locking up resources and harming their livelihoods.

"We can see many small fragmented groups in New Zealand like ourselves without any cohesion," he said.

He said the most super[illegible] [illegible] was [illegible] not [illegible] Government [illegible] to plant [illegible] exotic timber.

The conservationists were trying to [illegible] [illegible] and [illegible] money available.

Advice

To get their [illegible] going they have been taking the advice of a prominent Wellington lawyer, Mr Ian Dalgety, former president of the Society for the Protection of the Unborn Child, who has acted as agent for the Prime Minister, Mr Muldoon.

Mr Dalgety said in an interview today that he had advised them that it was essential if they were to protect their own communities that they reach out for support in other parts of the country and form a national organisation.

"I have advised that they lobby Parliament, involve themselves in litigation and involve themselves in communicating the [illegible] of small communities.

"They should [illegible] just be involved in thoughtful [illegible]

[illegible]

"Saddened"

[illegible]

[illegible] ("New Zealand Futures")

[illegible]

CHRISTCHURCH, August 4 (PA). — A meeting of more than 500 people at Whataroa this evening decided to establish a national organisation aimed at challenging the conservation lobby.

The organisation, to be named New Zealand Futures, plans to make contacts in other communities where it feels that traditional industries and resource developments are being threatened by pressure from environmentalists.

A member of the Westland National Park Board, Mr Bob Weston, said the organisation was not anti-conservation [illegible] must strive to present the other side with honesty.

"Many West Coasters will depend on it for their survival," he said.

A Wellington lawyer, Mr J D Dalgety, told the meeting the influence of the conservation lobby on politicians had been allowed to grow almost unchecked and threatened the lifeblood of many communities throughout the country.

"In establishing this organisation tonight you have probably made the single most important decision made on the Coast. For it to be effective we'll need much hard work and money from concerned New Zealanders," said Mr Dalgety.

The new organisation, based in Greymouth, will aim to present the case for the continuation of traditional industries and will fight unemployment.

Legal and public relations professionals will be employed to lobby politicians, prepare legal arguments, solicit membership and money. A target of $250,000 was agreed at the meeting.

Mr Dalgety said he believed large numbers of New Zealanders would support the principles of New Zealand Futures, particularly in Dunedin, Central Otago, Coromandel, Taupo, and Northland.

Mr Dalgety said hardline conservationists could fly down to the West Coast, look at the mountains, the forests and the birds and say they must preserve all this.

"But they do not see the people," he said.

"It is a sad day when mountains, forests and birds assume greater importance than men, women and children."

Mr Weston said the conservation movement was important and most West Coasters had more understanding for the environment than others.

"They depend on it for their livelihoods," he said.

Environment Minister's Attack

[illegible] HERALD in English [illegible]

Wellington Bureau

The Minister for the Environment, Dr Shearer, last night made a stinging attack on the plans of a Wellington lawyer, Mr J. D Dalgety, to help to set up an organisation to counter the national conservation lobby.

Dr Shearer described the project as "reactionary," "unrealistic" and "rather foolish" and he gave it little chance of success.

"I do not think he (Mr Dalgety) is ever going to counter the vast public opinion in favour of the conservation ethic," he said.

Asked for his views on Mr Dalgety's plans, Dr Shearer told the Herald he did not think they warranted wide publicity.

"I think it is a rather foolish move on his part," he said.

It ran contrary to public opinion and to the ideal of integrated development and conservation policies as expressed last year by the Nature Conservation Council.

"Mr Dalgety is flying in the face of that," said Dr Shearer. "His approach is very much a reactionary one."

Dr Shearer said there would be no reversal of the Government decision to incorporate the Waikukupa and South Okarito forests into the Westland National Park — the first objective of Mr Dalgety's clients.

West Coast people should already know that. They should also be aware of the move now in train to shift from an "extractive and exploitative" approach to one more concerned with constructive development.

A manifestation of the more modern approach was the science and technology assessment group — a group of experts drawn in part from the Department of Scientific and Industrial Research.

The group had recently completed a report dealing with development options for the Buller region, Dr Shearer said, adding: "I think Mr Dalgety would be far better advised to read that when it is available rather than take this very negative attitude down on the West Coast."

The group project had pointed to methods of creating far more jobs than would be lost by the cessation of logging in the two coastal forests.

The loss of those milling jobs was obviously inevitable in any case because "ultimately the logging would disappear because the trees would disappear."

New job creation possibilities should be developed now.

"This is what we should be looking at." Dr Shearer said, "rather than trying to go back to something we were doing 100 years ago, as Mr Dalgety is apparently trying to do."

Group Spokesman's Response

Auckland THE NEW ZEALAND HERALD in English 9 Aug 82 p 2

/Excerpt7

Wellington Bureau

A group recently set up to counter the national conservation lobby has defended itself against an attack by the Minister for the Environment, Dr Shearer.

A spokesman for the group, NZ Futures, Mr John Huston, said Dr Shearer's comments showed a lack of appreciation of the organisation's aims.

Dr Shearer had said the group was "reactionary," "unrealistic" and "rather foolish." He gave it little chance of success.

Mr Huston said thousands of New Zealanders wanted to restore some balance to the views promoted by "the extreme greenies and preservationists."

"For too long the views of those of us who live and work in resource-rich areas have been ignored," he said.

The members of NZ Futures were conservationists, not preservationists, who appreciated the natural resources as much as, if not more than, the minister.

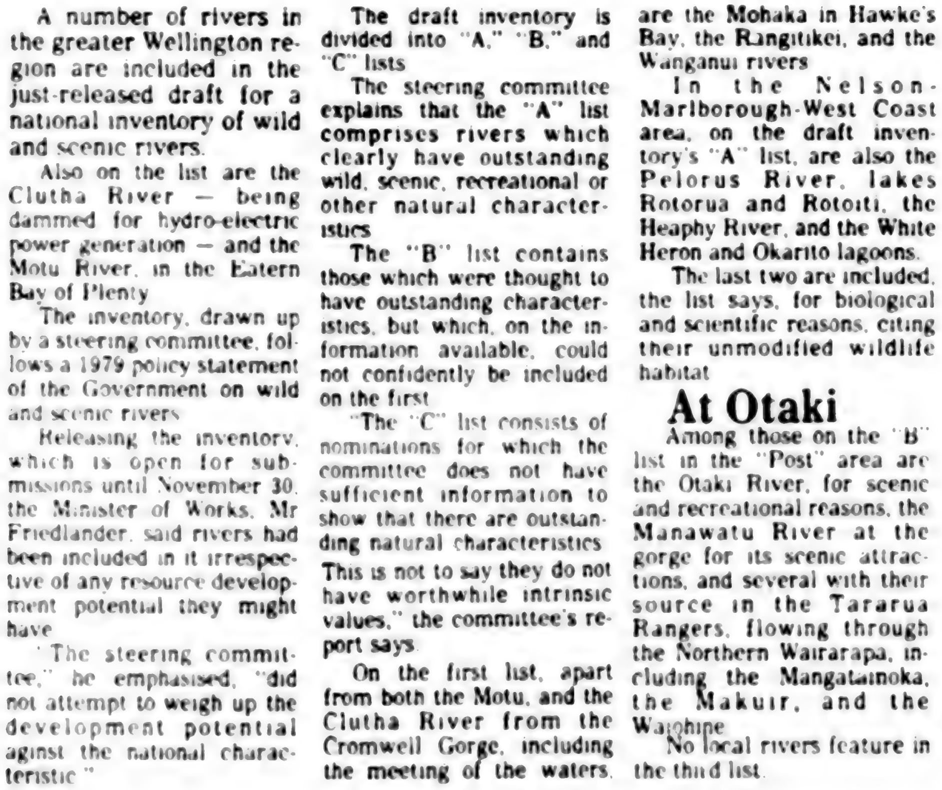
"NZ Futures' main function is to encourage New Zealanders to think about and support rational and balanced resource management," said Mr Huston.

CSO: 5000/9077

INVENTORY OF SCENIC RIVERS INCLUDES ONE BEING DAMMED

Wellington THE EVENING POST in English 10 Aug 82 p 24

/Text/



A number of rivers in the greater Wellington region are included in the just-released draft for a national inventory of wild and scenic rivers.

Also on the list are the Clutha River — being dammed for hydro-electric power generation — and the Motu River, in the Eatern Bay of Plenty.

The inventory, drawn up by a steering committee, follows a 1979 policy statement of the Government on wild and scenic rivers.

Releasing the inventory, which is open for submissions until November 30, the Minister of Works, Mr Friedlander, said rivers had been included in it irrespective of any resource development potential they might have.

"The steering committee," he emphasised, "did not attempt to weigh up the development potential aginst the national characteristic."

The draft inventory is divided into "A," "B," and "C" lists.

The steering committee explains that the "A" list comprises rivers which clearly have outstanding wild, scenic, recreational or other natural characteristics.

The "B" list contains those which were thought to have outstanding characteristics, but which, on the information available, could not confidently be included on the first.

"The "C" list consists of nominations for which the committee does not have sufficient information to show that there are outstanding natural characteristics. This is not to say they do not have worthwhile intrinsic values," the committee's report says.

On the first list, apart from both the Motu, and the Clutha River from the Cromwell Gorge, including the meeting of the waters, are the Mohaka in Hawke's Bay, the Rangitikei, and the Wanganui rivers.

In the Nelson-Marlborough-West Coast area, on the draft inventory's "A" list, are also the Pelorus River, lakes Rotorua and Rotoiti, the Heaphy River, and the White Heron and Okarito lagoons.

The last two are included, the list says, for biological and scientific reasons, citing their unmodified wildlife habitat.

At Otaki

Among those on the "B" list in the "Post" area are the Otaki River, for scenic and recreational reasons, the Manawatu River at the gorge for its scenic attractions, and several with their source in the Tararua Rangers, flowing through the Northern Wairarapa, including the Mangatainoka, the Makuir, and the Waiohine.

No local rivers feature in the third list.

CSO: 5000/9077

ENVIRONMENTAL AUDIT CLEARS CLUTHA RIVER HYDRO PROJECTS

Wellington THE EVENING POST in English 19 Aug 82 p 5

[Text] **The Commission for the Environment has approved plans for further hydro projects on the upper Clutha River — but has suggested that the fourth and fifth dams in the proposed valley development be halted.**

Although it was asked to audit environmental studies of the proposed Luggate and Queensberry projects, which are intended to follow the completion of the Clyde dam, the commission went a stage further and proposed that a conservation order be placed on the Kawarau River, which branches off the Clutha at Cromwell.

This would mean scrapping proposed power projects at Kawarau and Gibbston.

Seismic

The commission also recommended that, in light of seismic activity in the region, planning consents should not be sought for the Luggate and Queensberry schemes until the results of DSIR seismic studies are known.

The fear here was that not enough was known about the area in seismic terms, and that studies should be able to indicate whether there was any potential earthquake danger to the hydro construction works.

Apart from these aspects, the commission was generally pleased with the environmental impact report prepared by the Ministry of Works and Development for the Luggate and Queensberry schemes.

Its audit was based on the findings of this report, and on submissions that had been received in respect of the report.

The commission noted that of the four development options studied by the ministry, the preferred option not only had the least environmental impact, but would also produce the most power.

Demand

It also noted: "In spite of uncertainty over the future of the proposed second aluminium smelter, growth in overall power demand continues and will continue as long as there is growth in the economy.

"Electrical energy from the proposed Luggate and Queensberry power stations will therefore have an 'end use' sooner or later.

"It may for example be transmitted to meet the growth in North Island power requirements."

However, the major loss caused by the projects would be that of the Clutha River itself, which in effect would be turned into a connected series of hydro lakes.

The commission said it should be recognised that there was a ceiling on New Zealand's hydro-electric potential.

It questioned whether the Kawarau River should meet the same fate as the Clutha, and concluded:

"Above all, the end of the Clutha brings an opportunity to learn from past mistakes. In this sense it can have an important role in the progress of the nation."

CSO: 5000/9077

GOVERNMENT REFUSED WATER RIGHTS TO CLUTHA HIGH DAM

Wellington THE EVENING POST in English 20 Aug 82 p 6

/Text/

THE Government has been refused the water rights for a high dam on the Upper Clutha, near Clyde in Central Otago, in the latest in a series of legal wrangles over the issue.

The Planning Tribunal, which sat in a reconvened hearing in Hamilton earlier this month, ruled yesterday that applications for the rights should be refused

The tribunal originally granted the rights but it was stalled by the High Court in Christchurch. The court directed the tribunal to take end-use of power generated by a high dam into consideration.

The construction of an aluminium smelter at Aramoana near Dunedin was a crucial factor in the end-use of the power

In its reserved decision yesterday, the tribunal found there was either no or insufficient evidence "which could lead us to find that a smelter is likely to be built."

The judgment said the tribunal was "driven to the conclusion . . . that a high dam with its consequential inundation of valuable land, should not be built. Therefore, the decision of this tribunal is that the appeals are allowed and the applications are to be refused."

Yesterday's decision came after several legal steps in the Government's bid to fully develop the Upper Clutha between Roxburgh and Wanaka for hydro-electricity. Originally, the development was contingent upon the Aramoana smelter — the flagship of the Government's growth strategy — being built, but the Energy Minister, Mr Bill Birch, later said energy planning reappraisals meant the dam at Clyde would be needed regardless of the smelter

The Government was originally granted the water rights by the National Water and Soil Conservation Authority but Central Otago orchardists — whose land would be flooded — and environmentalists took their case to the tribunal.

It upheld the authority's decision and an appeal against the tribunal's decision was lost.

Challenged

The grounds for the appeal judgment were challenged in the High Court and Mr Justice Casey ruled the tribunal should have taken end-use of the Clyde power into account when it made its decision. The tribunal therefore sat again.

The judge had found that by not taking end-use into account, the tribunal had "deprived itself of the ability to take fully into account the promotion of soil conservation . . ."

In its judgment, the tribunal said there was no evidence to persuade it that a smelter was likely to be commissioned by 1985-86, and it then had to consider whether the high dam would still be needed anyway for electricity generation.

It had submissions from the electricity sector planning division of the Ministry of Energy but said its contents were not canvassed extensively at the original hearing.

"Indeed, neither counsel nor the members of the tribunal could recollect how it formed part of the record," the judgment said. "Accepting, for the purpose of the argument that it was properly produced by an expert competent to answer questions about it (and it appears to be conceded that it was not) that report does not cause the tribunal to resile from the finding of fact . . ."

The judgment said: "Consequently, having found that there is either no, or insufficient, evidence which could lead us to find that a smelter is likely to be built we are driven to the conclusion, upon the evidence before us, that DG3 (the high dam) with its consequential inundation of valuable land, should not be built.

Unanimous

"Therefore the decision of this tribunal is that the appeals are allowed and the applications are to be refused."

The tribunal, chaired by Judge W J Treadwell, was unanimous and one member, Mr R E Hermans, added his own comments, saying why he agreed with the decision.

The tribunal, which mentioned the tenacity of the appellants, awarded "substantial" costs but reserved a decision on how much. The Government had previously said it would pay their costs.

It added in its judgment on costs that there is an important distinction between legislation which changes the law for the future and legislation which may in effect deprive a litigant of the fruits of that litigation.

". . . We have previously stated that legislation is a matter for Parliament not the expressed intention of individual members of that Parliament. However, whether legislation is, or is not passed, does not change our view on costs."

SOURCES OF POSSIBLE SOLUTIONS FOR BANGKOK POLLUTION PROBLEMS DISCUSSED

Bangkok BANGKOK POST in English 13 Jun 82 p 24

[Article by Sakuntala]

[Text]

ALTHOUGH just back from a whole day of sightseeing, English actress Judi Dench who has the leading role in Thames TV's "Saigon," currently filming here on location, was fresh and happily tried on for our benefit a small rattan hat which fits her head snugly like a helmet. She had bought the hat that afternoon, and thought it very pretty and quite a bargain at 10 baht.

She took off the hat, saying that she wished she could do more sightseeing and shopping, but that soon she would have to start working and it would be mostly that for her until the last day of filming on July 24.

"I took on this role because I had worked before with the director, Stephen Frears, and he's a friend," she said. "I thought at first that the play would be made somewhere in England, nothing so wonderful as coming all the way here. My role is somewhat similar to that in an Irish play, "Langshire, Go Home," which I did on location in Ireland.

"On the surface, the Englishwoman I'm playing this time is kind of pale. She works as the assistant manager in a bank and her clothes and manner belie her true nature, for deep inside she's a very passionate woman — but that's her secret side."

Judi Dench never bothers about memorising her lines — she happens to have a photographic memory.

"I can see the lines as though the page is in front of me," she said. "That doesn't mean that I don't forget them. I do ad lib quite a lot and anything can affect a performance. In the theatre, an actor can be affected by the audience coughing, the heat, smoke, and so on. But on stage, you always have another chance to do better than the night before, which isn't the case when filming. You can do any number of takes when filming but you don't get to reflect on your performance to try to improve it, which is entirely possible in an ongoing play."

She would worry about something and try to make it perfect. Actors, she pointed out, have so many opportunities to "encapsulate" experiences, and then briefly and quickly communicate their feelings to an audience.

On the other hand, TV and film work suits her well because of the relatively shorter period of time it takes to do compared to a theatrical play.

After the birth of her daughter, Tara, in 1972 she started doing a lot of TV plays. She is married to Michael Williams and they are both members of the Royal Shakespeare Company.

She had always thought she would marry somebody in the entertainment business, but not another actor.

"But then my marriage has worked out wonderfully," she said. "It depends on what you decide is the most important thing for you, and I have always put my family before my career. It's essential, especially since both my husband and I married late."

Since her daughter was born, she explained, she had arranged her work so that she would not have to be away from her child for any long periods of time. Her 12-year-old daughter is, in fact, joining her in Bangkok during the latter part of the filming

She has been working steadily and very successfully on stage and TV for several years' running when a bit of disaster struck. She snapped her Achilles tendon while rehearsing for the hit musical, "Cats" last year, causing her to miss a great deal of work

When not working, she enjoys doing a lot of sewing and drawing. She received professional training as a designer before she decided she would rather be an actress.

"I suddenly thought I would be no good as a designer, and so I went and trained for three years with the Royal Shakespeare Company, and I had the extraordinary luck of playing Ophelia right away. By the way, as I look back on my career, I can see that all of it can perhaps be attributed to luck."

She chooses her roles instinctively.

"I'm a creature of instinct," she said. "I must either trust or distrust a role. Sometimes I'm wrong, but often I'm right."

Returning to a busy work schedule, she would be doing two plays in London immediately after she completes her work here. From July 26, she will be appearing in a new stage production of Oscar Wilde's "The Importance of Being Earnest" and in a one-act play, Harold Pinter's "A Kind of Alaska," about a woman with sleeping sickness.

She has decided to keep a diary of her stay here.

"I'm jotting down every single thing, so that the family misses nothing. Normally I don't keep a diary, but Bangkok is an entirely new experience for me and I'm going to share as much of it with my family."

She was thinking of her family when she put her name on two tiles in a temple building in Nakhon Pathom recently

"I love the thought that our family name is on those tiles," she said

ALBANIA

SUCCESSES, SHORTCOMINGS IN ENVIRONMENTAL PROTECTION EFFORTS

Tirana RRUGA E PARTISE in Albanian May 82 pp 45-52

[Article by Tahir Cenko: "Keeping the Environment Clean Is An Important Measure for the Protection of the People's Health"]

[Text] The pronounced prophylactic character given to our public health, without in any way underestimating its curative purposes, is another confirmation of that great care the party shows to protect the health of the workers, and to provide for them the best possible living and working conditions. On this basis, during the period of the Seventh Five-Year Plan, in the field of protecting the people's health "all round prophylactic measures will be taken in cities and especially in the villages for expansion and qualitative improvement". (Enver Hoxha, "Report to the Eighth Congress of the Albanian Workers Party (PPSH)", p. 56).

Among the prophylactic measures, which deal with protecting and strengthening the health of the people, of special and increasing importance is the protection of the environment from pollution, and the scheduling and implementing of a number of complex measures in this field by state, health and social services, which will create for the inhabitants and workers in the cities and the villages optimal living and working conditions.

Environmental protection, basically, aims at protecting certain relations which were defined and determined in nature, on land, in water and in the skies long ago, whose breakdown would lead to disorders which would negatively influence, directly or indirectly, our economic resources, the flora and the fauna, and even the physiological condition and health of the people, and of all those who work and live in any envoronmnnt where these disorders exist. This is the reason why, in our socialist society, the struggle against environmental pollution is inseparable from that great, continuous, all-encompassing care the party has shown and continues to show for the life and health of the people.

During the years of the people's government, by special laws and decisions, measures have been defined to protect our waters, air and soil from poisonous materials and gases. Parallel to the fast rate of growth of our industrial works, the use of chemicals in agriculture, urban development and so on, numerous technical and organizational, hygienic and health measures have been taken in our country to see that liquid, solid and gaseous wastes are processed to become as harmless as possible to the environment where they are dumped or scattered. This goal has been helped, among other ways, by the construction of a plant which separates the arsenic from the discharges of the nitrogen fertilizer factory in Fier, by the neutralization of polluted waters in the superphosphate plant in Lac, by similar antipollution measures in the sodium-PVC plant in Vlore; the measures taken in the petroleum processing plants in Fier and Cerrik, those in the copper enrichment plants in Kurbnesh and Reps, in the paper factories and in many light industry and food processing plants, and so on. An important role in keeping environmental pollution at levels harmless to the population has been played by the party's policy of distributing economic projects, especially industrial ones, throughout the country, as well as establishing in some districts such as in Durres, Shkoder, Vlore, Elbasan, Fier and other places industrial zones far from inhabited areas, in accordance with health and hygiene norms.

Nevertheless, protecting the environment from pollution remains a constant and continuing problem. The new fast-growing developments in the numerous branches of our industry, some of which discharge harmful wastes, are required to maintain and increase their concorn to make these discharges as harmless as possible to the health of the wokkers and the health of those who reside near industrial projects. But, there has to be even greater concern due to the fact that the work which has been done until now to neutralize the hazardous effects of liquid, gaseous and solid waste elements which are discharged in the surrounding environment has not always been at the required level.

Meanwhile, as the Eighth Plenum of the Central Committee of the Party of June [illegible] revealed, some problems have now surfaced in the area of environmental protection which require scientifically based, complex and harmonious solutions. At the same time, it is necessary to create and deepen a healthy, active and widespread social opinion that these problems cannot be solved only by the activity and input of the state and economic organs, and certain other organs which specialize in this field, no matter how well thought-out, widespread and effective the technical and organizational measures they implement are. Because of its special characteristics, the whole mass of workers and inhabitants in the cities and the villages have to become active in the struggle to keep the environment clean. Only with this concept of the matter and the total activization of the workers in the solution of problems which surface will it be possible to prevent pollution, as it has been done upto now, from reaching unacceptable levels.

Naturally, the state and economic organs, from the basic units of work and production up to and including the government departments, and the central institutions have special tasks for protecting the environment from pollution. According to the party directives, these tasks have been carefully defined by decrees and special decisions. Nevertheless, in implementing the decisions of the Council of Ministers for November 1973, a whole system of organizations has come into existence which is directlv concerned with environmental protection and includes groups which have been established for this purpose in enterprises and agricultural cooperatives, the permanent commissions in the districts and the government departments, as well as in the central commission for environmental protection attached to the Council of Ministers of the organs and organizations has its own responsibility and tasks. What remains to be seen is how energetic these organizations are in their activities to solve the problems thay encounter competently, effectively and with a profound feeling of responsibility. We stress this because the increasing concentrations of pollutants in the air, in surface waters of lakes, in reservoirs, sea water and so on, which have been noted here and there, and which was emphasized by the Eighth Plenum of the Central Committee of the Party, as well as occasional job-related illnesses which appear among workers who work in these surroundings, testify to negligent attitudes in implementing the protective measures defined by law by some cadres and government and economic organs, as well as by certain workers who underrate the regulations and the recommended measures. For example, when it is known that dry drilling in the copper mines pollutes the air in the galleries with elements harmful to the health, what are the managers of these mines, and the groups responsible for the protection of the environment in them, going to create the needed material conditions and the convictions to change to wet drilling?

The deficiencies which are noticed in the work of some groups and commissions responsible for environmental protection are explained in great measure by the erroneous opinion which some cadres and workers have that environmental pollution does not pose a disturbing problem for us. In order to reject this idea, it is necessary to make it apparent that, although the studies made in different branches of our economy, in the chemical, metallurgical, mechanical, mineral, the paper and wood treatment industries, in agriculture and elsewhere have proved that our country as a whole is free of those elements which are harmful to the health of the people, the flora and the fauna, these generally positive conclusions must not be allowed to create any feelings of self-satisfaction. First of all, because these studies have determined that, although the situation is good in general, there are hidden negative cases, as for example, in some industrial zones and enterprises where complete prophylactic, technical and organizational measures have not been taken, pollution, above the acceptable levels, has been found. It has been found where the rivers Shkumbini, Semani and Erzen flow, it has been found in the atmosphere around the cities of Tirana, Rubik, Kukes, Elbasan etc. Secondly, it would be erroneuous not to see the situation within the dynamics of the new developments, especially since it is well known that with the rapidity and the character which the development of our economy will have during this five-year period, and in the future, the possibilities exist for an increase in air, water and soil pollution if we do not implement the proper measures at the proper levels to prevent the pollution.

Examining and evaluating the problem in this manner will increase the feeling of responsibility in the groups and commissions charges with the prevention of environmental pollution, from the industrial enterprises and agricultural cooperatives to the central departments. It will place them in positions of effective control and work, and based on the authority which has been assigned to them, demand strict respect, and implementation on time of measures that have been defined, thus making administrators and managers responsible for any violations of the regulations or delays and misrepresentation of the works which guarantee the protection of the environment and the health of the people.

The organs of the health inspectorate have the important task of monitoring the situation and activating the organs, the people and the apparatus responsible for implementing measures which will protect our environment from pollution and the health of the workers and the citizens. It is a fact that their work in this area has had its own positive results. After each inspection, especially when they have seen violations, they have made on the spot appropriate criticisms and recommendations for technical and organizational measures, as well as ideological, political and propaganda measures that should be taken. Again and again they have intervened, in special and important cases, even on the ministerial levels, and in very serious cases, they have had the activity of the enterprise concerned suspended until the necessary measures were taken and the situation improved. In general the criticisms and recommendations were well received and have resulted in the taking of measures which have helped in isolating the difficulties. However, there have been indirect intercessions and pressures to the health inspectorate from enterprises and managers, and on rare occasions from an executive committee of a district people's council, and even a government department to make exceptions under the pretext, among other things, that "the fulfillment of the production plan is being harmed", as if the necessary measures against environmental pollution and the protection of the worker's health were not part of the production plan, and were not directly involved in the fulfillment of that plan.

Experience shows that the efficiency and activity of the groups and commissions involved in the protection of the environment, as well as the work of the health inspectors and organs in this area, is greatly increased by their cooperation and coordination with each other. Therefore, it is requested that this cooperation and coordination of forces, work programs, exchange of experience, and so on, should be instituted everywhere and become scheduled and organized work practice. Their activity must be directed towards placing the management organs of the economy and the state on the soundest possible work positions for the protection of the environment, because these organs have been charged with and are directly responsible for seeing that regulations are obeyed, preventive measures taken and tasks completely implemented in this area. They are also responsible for all the other duties of the plan in all their economic and financial indicators.

The recommendations of the party make us clearly understand that the problems of environmental protection are not matters of less importance or little importance which can be underestimated. They are part of our objectives and plans, with political, economic and social consequences for the present and in the future. Any negligence in this field can have immense negative effects, even harming the health of the people. To understand this we cannot say that we experience without learning. We can and should always learn through other peoples bad experiences.

Socialism shows its superiority in the field of environmental protection. The Eighth Plenum of the Party Central Committee of June 1980 places scientific problems which deal with this matter in their proper place, by correctly evaluating the negative consequences from growing concentrations of pollution in the air and surface waters, which are noted here and there, as well as the pollution from the use of herbicides, insecticides and pesticides in agriculture without proper criteria. In this plenum the party directed that scientists must, in cooperation with specialists, cadres and production workers, further deepen and broaden their research in this direction, overcoming empirical and amateurish characteristics that are noted occasionally.

This party directive has special value and sets important tasks for the entire system of our scientific research institutions, which have been established and function for the different branches of our economy, and for all the health institutions, so that everyone in his line of work will face and confront with high effectiveness the problems which our development creates in the field of environmental pollution. They are required, while devoting all their attention to these problems and establishing the closest cooperation and coordination of work among themselves, to constantly broaden and deepen their research, not only to track the levels of pollution on time, and define correctly the origins and reasons for this pollution, but also to define necessary measures which will isolate and prevent this pollution and its negative effects. We are speaking here of deep research and necessary measures which should be defined and implemented from the planning stages of projects until they are constructed, and should continue all the time they are in use. This also applies to a number of other projects as well. When it is known, for example, what negative effects the use of pesticides, insecticides and chemical fertilizers may have on the environment when used without strict scientific controls, it is necessary for the agricultural and chemical scientific research institutions, while defining ways to use them more efficiently, to extend and define measures which have to be employed for the storage, transportation and the use of these materials under strict technical and scientific criteria and disciplines so that the environment will not suffer and there will be no negative consequences for the health of the people and the well being of animal life.

However, the most important and the most responsible tasks for broadening and deepening the discovery and prevention work in scientific research belongs to the health institutions from headquarters down to the basic organs, especially the Institute of Hygiene and Epidemiology, as well as the directorates involved in this kind of work in the districts. So far this institute and these directorates, guided by the teachings of the party, have made efforts and given their contribution by measuring the levels of environmental pollution and isolating on time its sources and its negative effects. The institute has completed a number of studies to track the level of pollution of the microenvironment in some work and production centers in different sectors of the economy. Meanwhile by coordinating its research work with the work of other sectors of the economy and the life of the country, it has scheduled and undertaken broader studies, concentrating on some of the most important aspects of protecting the microenvironment, and especially the macroenvironment from pollution. And, it is a fact that the qualitative level of studies has continued to improve along with the increase in the range problems. The results of these studies have been made available to the work and production centers, where meetings with the engineering and technical personnel have been organized to define ways to eliminate environmental pollution. The respective government departments have been informed of these meetings. Because of this work, the organs concerned have been able to implement the results of these studies so that positive effects have already been felt.

However, the present stage of our development, and the achievement of the objectives which were defined by the Eighth Plenum of the Central Committee of the Party of June 1980, and later by the Eighth Congress of the party, require more complex studies on air, water and soil pollution, at a higher scientific level, based on minute physical, chemical, and agro-biological analyses in these categories of environment. In implementing the party directives for this five-year plan more complex studies have been undertaken, including some different aspects of the problem, such as the level of air, water and soil pollution from gaseous discharges, or the pollution of surface waters from industrial and urban discharges, and the pollution of food products from the use of pesticides in agriculture. Studies are also being completed on some job-related illnesses, which have their origins in the response of human organisms to toxic materials which are created in certain environments etc. Experience teaches us that implementing positive laboratory techniques for the massive tracking, as well as the testing of the environment not only is an important and accurate source of information, but also proposes the more accurate definition of more efficient measures.

Naturally, all the studies in the field of environmental protection have need of extra skilled management, they also need strong support from the Committee for Science and Technology and the Ministry of Health, especially in further strengthening the material and laboratory work base of the specialized scientific institutions and the other sectors which have been charged with studying and monitoring these problems, supplying them all with the necessary literature, and better organizing the specialization and the advanced training of the cadres etc. Meanwhile, in order to pass from the stage of becoming familiar with a problem to the implementation of the programmed measures, on the basis of the conclusions that have surfaced in the studies, an important role is played by the state and economic organs, as well as those of the state Health Inspectorate. It is necessary that the latter further strengthen their control and make accountable anyone who violates the norms and regulations which have been defined for the protection of the environment from pollution.

With the party's important propaganda work, our people are always evaluating better and better the harm that can result from underestimating the measures for the protection of the environment. To create the correct concept of the absolute necessity to protect the environment, an important contribution has been made by the workers in education and culture, the health services, the activists of the mass organizations, the press, radio and television etc. Nevertheless, there still remains much to do to make this a problem that concerns everyone, every worker and citizen in such a way that they will all struggle for examplary and continued hygiene and cleanliness at work, at home, in the city zones and everywhere.

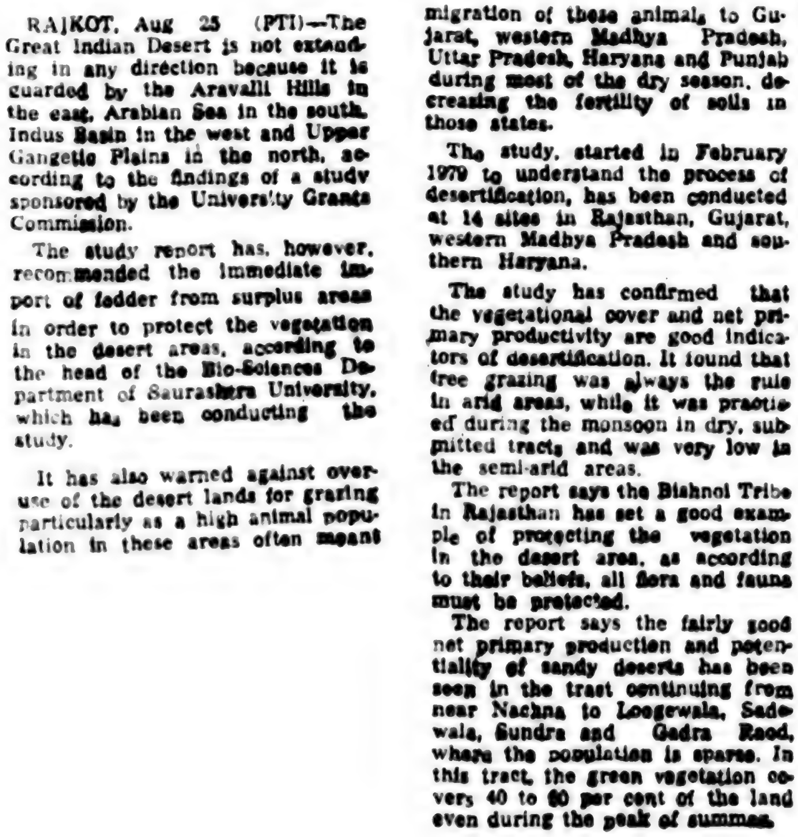
Keeping the environment free of pollution is the task of the basic organs and organizations, the state and economic organs, as well as the social organizations who must support the working class and the other working masses in the city and the villages, and encourage and motivate them to take concrete action to keep the environment clean. The capabilities are there if we evaluate and exploit the superiority of our socialist system, with better organization and systematic work from all our people, to always have, as we have had so far, clean air, clean water and green fields everywhere in our land.

[illegible]
CSO: 5000/3019

STUDY CONCLUDES INDIAN DESERT LANDS CONTAINED

New Delhi PATRIOT in English 26 Aug 82 p 5

/Text/



RAJKOT, Aug 25 (PTI)—The Great Indian Desert is not extending in any direction because it is guarded by the Aravalli Hills in the east, Arabian Sea in the south, Indus Basin in the west and Upper Gangetic Plains in the north, according to the findings of a study sponsored by the University Grants Commission.

The study report has, however, recommended the immediate import of fodder from surplus areas in order to protect the vegetation in the desert areas, according to the head of the Bio-Sciences Department of Saurashtra University, which has been conducting the study.

It has also warned against overuse of the desert lands for grazing particularly as a high animal population in these areas often meant migration of these animals to Gujarat, western Madhya Pradesh, Uttar Pradesh, Haryana and Punjab during most of the dry season, decreasing the fertility of soils in those states.

The study, started in February 1979 to understand the process of desertification, has been conducted at 14 sites in Rajasthan, Gujarat, western Madhya Pradesh and southern Haryana.

The study has confirmed that the vegetational cover and net primary productivity are good indicators of desertification. It found that free grazing was always the rule in arid areas, while it was practised during the monsoon in dry, submitted tracts and was very low in the semi-arid areas.

The report says the Bishnoi Tribe in Rajasthan has set a good example of protecting the vegetation in the desert area, as according to their beliefs, all flora and fauna must be protected.

The report says the fairly good net primary production and potentiality of sandy deserts has been seen in the tract continuing from near Nachna to Loogewala, Sadewala, Sundra and Gadra Raod, where the population is sparse. In this tract, the green vegetation covers 40 to 60 per cent of the land even during the peak of summer.

CSO: [illegible]/7036

CALL FOR HALT TO BEACH, OCEAN POLLUTION

Djibouti LA NATION DE DJIBOUTI in French 29 Jul 82 p 4

[Text] The declining condition of our beaches is indisputable, and it gets worse with every passing year. Once clean and limpid, the waters off our beaches are now muddy and hardly inviting for bathers. The fine crystalline sands that edged our beaches have been replaced by seaweed. We do not have any information on the status of sanitary conditions on our beaches, but just looking at the sites is enough to inspire the fear that in some instances the degree of pollution may exceed an acceptably safe level.

The causes of this pollution are diverse. First of all, looking at Siesta Beach, which extends from the hotel of the same name to Haramous, the cause there is the dumping of waste water.

In fact, due to the lack of a network of water treatment facilities, the sea serves as the receptacle for the water wastes of the coastal population and a number of industrial shops.

Completion of the waste water treatment and recycling facility being financed by the African Development Bank will do a great deal to lessen the pollution hazards in this sector.

There is also pollution resulting from "runoff" caused by the rain; thus we saw during the most recent rains that the wastes dumped at P.K. 10 off to the right of the Arta road were "washed away" by the rainwater that fell in the area (see our photo taken at the time). [photo not included] The runoff from the area contributed enormously to the pollution of the ocean and the Dorale coast.

This locale, which serves as a dump site for household garbage as well as the fecal wastes from the cesspool-draining trucks, is a source of pollution not only for Dorale beach and its environs but also for the artesian wells that provide drinking water for the people and livestock in the area. One can easily imagine the great risks run by the very large number of people who use these beaches and by the inhabitants as well.

But the most serious and dangerous threat to our coasts and beaches and our ocean and its ecology is hydrocarbon pollution.

We know that hydrocarbon pollution can kill marine life, destroy the coastal spawning areas of fish and crustaceans, and ruin the tourist value of the beaches.

Nowadays, all along our coasts, which extend over 350 km, one finds traces almost everywhere of hydrocarbons washed up from the sea, and this is the result of dumping or spills by the ships frequenting our port and our territorial waters. The situation may not be tragic as yet, but is high time to get concerned about it and take the necessary steps to prevent or minimize the harmful effects of hydrocarbons, which inevitably lead to the degradation of the marine environment. At present, our port--which is trying to do more refueling and fuel transhipment, a move which increases the risk of spills both in the port and all along our territorial waters--is not very well equipped, and does not have the technical means necessary, to put an end to the chronic pollution to which it is subjected or to cope with a possibly disastrous oil spill.

[illegible]
CSO: 5000/5787

HIGHLANDS WATER PROJECT CONSTRUCTION SET FOR 1987

Maseru LESOTHO WEEKLY in English 30 Apr 82 pp 3, 5

[Article by L. Lejakane]

[Text]

THE Lesotho-South African massive (M1.25 billion (at 1980 prices) water supply project, described as the biggest in the world, is still on, according to the Permanent Secretary of the Ministry of Water, Energy and Mining, Mr. Thabo Makhakhe.

Discounting South African press reports that the giant water scheme was in jeopardy because of political differences between the two countries, Mr. Makhakhe said the South African Government had dissociated itself from the press reports and assured the Lesotho Government of its firm commitment to the project.

CONSTRUCTION

According to plans construction is to start in 1987 and overall completion in 2005.

Lesotho is to build five huge dams with a capacity of 2,600 million litres. These dams will drain one another and ultimately into South Africa via 110 km of tunnels. An estimated 3,000 million litres will be supplied a day. Three hydro-electric stations capable of generating 50 MW of power will be build in Lesotho.

The Lesotho Highlands Water Project, (L.H.W.P.) first called Oxbow, has been a subject of protracted negotiations between the two countries since the 1960s with both sides eager to maximise benefits.

CONTROL

Progress on negotiations is said to have been delayed by persistent controversy over the physical control of the flow of water into the delivery tunnel. Both countries wanted to be responsible for the control. South Africa's fear seems to stem from its experience over the Cabora Bassa hdro-electric scheme now controlled by the Mozambique Government. It has reservations over possible disruptions of power that may result from political differences between the two countries.

However, the matter was resolved at the highest level during a ministerial meeting held in June 1981. "At that time, South Africa formally accepted the existence of a control structure in Lesotho, below the main power station, at the intake of the delivery tunnel," Mr. Makhakhe said.

ROUTE

Asked about the alleged threat by South Africa to get the Lesotho water by another route if negotiations break down, Mr. Makhakhe said South Africa had never threatened to obtain Lesotho's water by another route. He said South Africa had, however informed Lesotho that it was concurrently examining the feasibility of diverting water from other sources as part of the investigations into the Lesotho Highlands Water Project.

"This should not be construed as lack of faith, but as an integral part of the feasibility study where all possible alternatives must be identified so as to assess the economic viability of the project and eventually to form the basis for the discussion on tariffs and royalties," he added.

DIVERSION

Mr. Makhakhe said the Lesotho Government was aware of other sources available to South Africa.

He disclosed that preliminary evaluation of sources capable of delivering a comparable output showed that technically the diversion of the Orange River waters from the Hendrick Verwoed dam was a strong alternative.

It is, however, believed that both the capital and recurrent costs of such a project would be substantially higher than those connected with the L.H.W.P.

TOO EARLY

Asked about the share each country would provide for the project construction, Mr. Makhakhe said until the feasibility study was completed in 24-30 months from now and its conclusions available, it was too early to discuss the matter.

On short term benefits that would accurue to Lesotho, Mr. Makhakhe said they (benefits) would consist essentially of increased employment opportunities on the project itself. At peak construction time the project would need a labour force of 3,000 unskilled, skilled and professional staff. In addition to this, a network of all weather roads and tracks into remote montain areas would be build.

In the long term, revenue from the sale of water would be ploughed back into the national economy and thus strengthen country's financial situation.

A large measure of independence from South Africa will be ensured by the generation of hydro-electric power by the project.

CSO: [illegible]/5821

BRIEFS

ZAMBEZI DAMS--The Government has to make firm decisions if the Zambezi River hydro-electric project is to succeed, Mr R. du Toit, a consultant ecologist, said at the annual geographic meeting at the University of Zimbabwe yesterday. He said the country's supplementary electric energy requirements would not be met even with the opening of the Hwange colliery thermal power stations. Nor would inputs from Zambia and Mozambique improve the situation, he said. The Maputa and Batoka gorge projects needed "great and immediate" attention to alleviate the country's power needs. Damming the Maputa gorge near the Mozambican border would submerge the area "up to 14 km up the river." Another "Operation Noah" like that carried out during the damming of Kariba would have to be undertaken because of the threat to the lives of game in the area. The consultant said the proposed Batoka dam near the Victoria Falls could be constructed within two years and being smaller than the Maputa scheme, "the flow will be easy to harness and control."--Ziana [Text] [Harare THE HERALD in English 2 Sep 82 p 9]

CATTLE DYING--Bulawayo--Communal farmers in the Bambadzi area of Plumtree are losing up to 20 head of cattle a day through lack of water, according to reports reaching the Under-Secretary (Development) for Matabeleland South. Mr Jerry Nyathi said in Gwanda the water situation in the area had become extremely serious with cattle getting stuck in muddy dams in their quest for water.--Sapa [Text] [Johannesburg THE CITIZEN in English 8 Sep 82 p 8]

CSO: 5000/5816

UDC: 576.8.095:628.353.153

MICROORGANISMS OF THE NITROGEN CYCLE AS INDICATORS OF RESERVOIR POLLUTION

Alma-Ata IZVESTIYA AKADEMII NAUK KAZAKHSKOY SSR: SERIYA BIOLOGICHESKAYA in Russian No 3, May-Jun 82 pp 44-49

[Article by A. N. Ilyaletdinov and V. A. Verkhozina, Institute of Microbiology and Virology, Kazakh SSR, Alma-Ata, and Limnological Institute, Siberian Branch of the USSR Academy of Sciences]

[Text] Waste from a paper and pulp combine dumped into Lake Baykal stimulates activity of microorganisms referable to different physiological groups. Bacteria involved in decomposition of waste serve as indicators of the corresponding pollutants, as well as the main factor in self-purification of the reservoir.

This article deals with demonstration of the influence of waste diluted to varying degrees that is dumped from the treatment plants of the Baykal Paper and Pulp Combine on processes of ammonification and nitrification, as well as the study of distribution of microorganisms of the nitrogen cycle and changes in their activity in areas subject to the effect of the anthropogenic factor.

Conventional methods and media were used for detection of bacteria of the nitrogen cycle [1]. We determined the quantity of nitrifying bacteria by the titer method [2]. Determination of level of potential nitrification was based on the Waxman method. Potential nitrification was examined by cultivating samples on the media of Vinogradskiy. Nitrates were demonstrated by the disulfophenol method [3]. Tests were conducted in aquariums. Commercial waste was added to Baykal water in a ratio of 1:60. In another aquarium, with 1:60 dilution, we added liquid sewage in an end dilution of 1:10 after 24 h. Pure water from Lake Baykal served as a control. The test was conducted at a temperature of 5-12°. The experiment lasted 25 days, since 40-70% of the organic matter in waste was readily mineralized by microorganisms in water within 5-20 days.

It is rather difficult to assess the effect of waste from a paper and pulp combine on the microbial process of the nitrogen cycle in the field, since [illegible] factors, hydrochemical and hydrological conditions in the lake could [illegible] strong influence on distribution of this group of microorganisms. It is [illegible] to track the transformation of nitrogen-containing organic matter contained in waste dumped into water in a laboratory experiment.

Ammonifying bacteria are encountered in minimal quantities in clean water (Figure 1), but when industrial waste is added their number grows rapidly reaching a maximum on the 8th day of incubation. When liquid waste is added daily, one observed a drastic increase in ammonifying microorganisms on the [illegible] experimental day, after which it decreased and equaled the number of microorganisms in the control after 2 weeks.

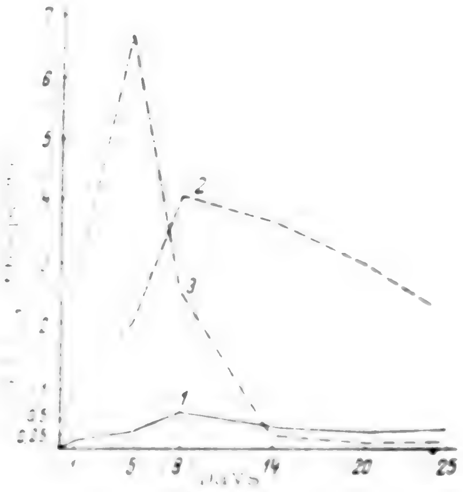


Figure 1.
Change in number of ammonifying bacteria
(1) control, pure Baykal water
(2) industrial waste diluted to 1:60
(3) daily addition of industrial waste, and dilution 1:10

Figure 2a illustrates the level of ammoniated nitrogen under our experimental conditions. The peaks of increase in ammoniated nitrogen coincided with the increase in number of ammonifying bacteria, although the quantity of bacteria was somewhat smaller in the control. We conclude from this that the increase in ammonia under laboratory conditions is attributable to the activity of ammonifying microorganisms (see Figure 2a, *1* and *2*). With continuous addition of waste, after a peak ammonia level (5th day) we observed a decline in level thereof and another elevation on the 20th day (curve *3*).

The increase in concentration of ammonia nitrogen with low number of ammonifyers could be attributable to inhibition by toxic substances of microorganisms with low dilution and continuous addition of waste. The same could be the cause of regions with low number of saprophytic bacteria at the waste dumping site [5].

We traced the activity of nitrifying bacteria according to change in amount of end products of their vital functions. Traces of nitrites appeared 1 day after the start of the experiment. Nitrification begins in liquid waste only after the amount of organic matter drops to a minimal level. It can be noted that the highest amount of nitrogen nitrite, with a peak on the 8th day, was observed in pure Baykal water. With addition of waste to this water in a ratio of 1:60, there was some decrease in activity of first-phase nitrifying bacteria. [illegible] shows that organic substances inhibit development of nitrifying bacteria cells, and the process of oxidation of ammonia to nitrites regresses. When large amounts of liquid waste are added, the level of nitrogen nitrite is very low, due to the high level of organic matter in the medium, as well as effects of [illegible] contained in the waste.

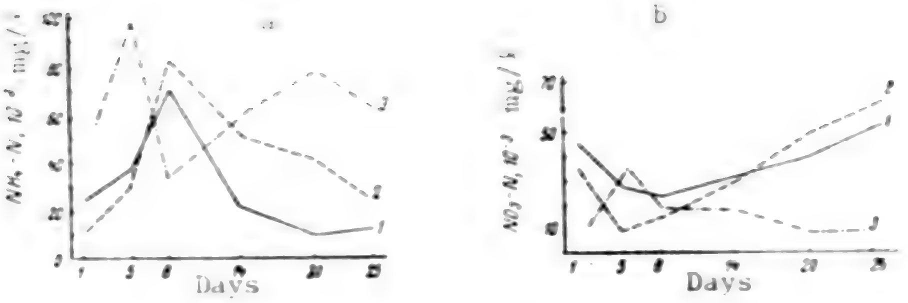


Figure 2. Change in levels of nitrogen ammonia (a) and nitrate (b) (arbitrary designations are the same as in Figure 1)

The changes in nitrate nitrogen content were somewhat different. On the first days of the experiment, the control showed a drastic reduction in amount of nitorgen nitrate, followed by an increase (Figure 2b). The same was observed, but only to a more marked degree, when the water was diluted with waste (1:60). This is perhaps due to the fact that the ammonifying bacteria, which developed intensively, absorbed oxygen. Nitrifying bacteria were temporarily under adverse conditions for vital functions. Only after the organic substances were utilized and activity of ammonifying microorganisms stabilized did the nitrifying bacteria start to function. On the whole, on the 25th day the nitrate level was higher in water with added industrial waste than in the control, 0.064 and 0.055 mg/ℓ, respectively.

With continuous addition of waste to Baykal water, the level of nitrates of nitrogen was drastically lowered (Figure 2b, *3*), although the level of nitrogen ammonia remained rather high (Figure 2a, *3*). It is known that ammonia ions arrest the activity of the stimulator of the second phase of nitrification. It should also be noted that these organs are highly sensitive to some toxic agents contained in liquid waste.

Thus, in the case of modeling in the laboratory, it was demonstrated that liquid waste in a dilution of 1:60 stimulates the activity of ammonifying bacteria. Processes of destruction of nitrogen-containing organic matter are intensive for 20 days from the time waste is added, with maximum activity on the 8th experimental day. This dilution did not depress nitrifying bacteria, and accumulation of nitrates proceeded in water with added waste. Regular additio of liquid waste to water and mild dilution (1:10) depresses development of ammonifying and nitrifying organisms. Nitrogen ammonia accumulates in the medium.

One can assess the rate of breakdown of nitrogen-containing substances of liquid waste according to quantitative distribution of different groups of nitrogen cycle bacteria and intensity of processes.

In March 1979, ammonifying bacteria in the water of Lake Baykal opposite the site of drainage of liquid waste constituted 240 cells/mℓ on the surface and 287 cells/mℓ at a depth of 40 m (Figure 3). At a distance of 1 km from the

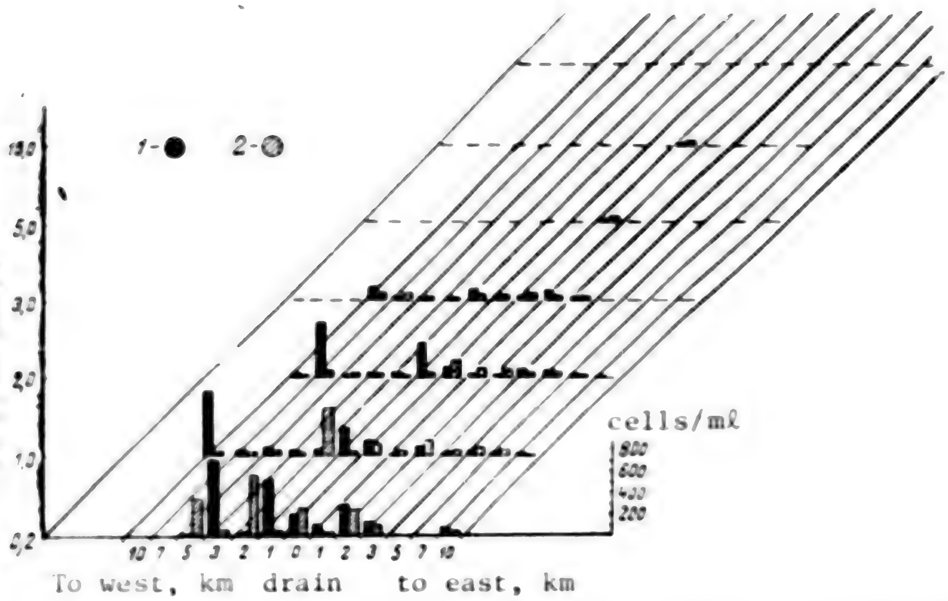


Figure 3. Quantity of ammonifying bacteria in region of industrial waste dumping

1) on water surface
2) at depth where maximum electric conductivity was recorded

dumping site, in the pelagic region of the lake, the number of ammonifying bacteria dropped to 155 cells/mℓ, at 2 km from the zero point they constituted 119 cells/mℓ, at 3 km--22 cells/mℓ and at 10 km--8 cells/mℓ. There is uneven distribution of ammonifying bacteria to the east and west from the drainage point, but we can note that their quantity diminishes as the distance increases from the drainage site to the east, west and pelagic zone of the lake. The largest number of ammonifying bacteria (up to 860/mℓ) was observed 3 km west of the drain, 0.3 km away from shore. Their number decreases to a few cells/mℓ as the distance from the site of waste dumping increases.

In March 1980, the distribution of ammonifying bacteria was somewhat different. In the immediate vicinity of the waste-dumping pipes, they number tens of cells and at some distance hundreds of cells/mℓ, versus isolated cells/mℓ in a clean area. The maximum number of ammonifying bacteria was 189 cells/mℓ in the superficial layer and 245 cells/mℓ at a depth of 25 m. The amount of ammoniated nitrogen in the water of Lake Baykal changes from 0.005 to 0.009 mg/ℓ in the dumping region and east of it, versus 0.014 to 0.042 mg/ℓ in a clean area. This shows that it is possible for microorganisms to immobilize nitrogen. The increase in carbon-containing substances in the medium leads to having the released nitrogen absorbed by developing microorganisms and being fixed in a protein form. For this reason, in regions with maximum number of ammonifying bacteria one observes a decrease in ammoniated nitrogen.

In July 1980, the quantity of ammonifying bacteria was, on the whole, greater than in March, although it did not exceed 840 cells/mℓ in the surface layer of water and 1290 cells/mℓ at a depth of 25 m. In a clean region, the quantity of ammonifying bacteria in July did not exceed 45 cells/mℓ. There was even more irregular distribution of the group under study in July, but it should be noted that maximum quantities of ammonifying bacteria were encountered east of the dumping site (see Figure 3). Perhaps, the current that is always in an easterly direction in this region had an effect [6].

In the period when water is under ice, there were 100 cells/ nitrifying bacteria in the dumping site and their number decreased to 20 cells/ℓ in a clean area. In July, the number of nitrifying bacteria in the region affected by waste was up to 150 cells/ℓ versus no more than 5-10 cells/ℓ in a control area. This is attributable to access of ammonia ions with waste, as well as production thereof as a result of vital functions of ammonifiers. The water's capacity for potential nitrification diminished as the distance from the dumping site increased. Thus, in March 1979, potential first-phase nitrification constituted 7 mg/m^3 in the surface layer of water at the waste dumping site and 0.24 mg/m^3 10 km away (Figure 4). Analogous findings were made at depths where maximum electric conductivity was recorded. In March 1980, potential first-phase nitrification constituted 9.5 mg/m^3 in the dumping region on the surface and 11.5 mg/m^3 at a depth of 25 m, although in the control it did not exceed 1.7 mg/m^3. It can be noted that potential first-phase nitrification increases to the east of industrial waste dumping, repeating the pattern of distribution of ammonifying bacteria. In July, potential first-phase nitrification was higher than in March, reaching 9 mg/m^3 in the dumping region and dropping to 0.3 mg/m^3 at a distance of 5 km in the pelagic zone of the lake.

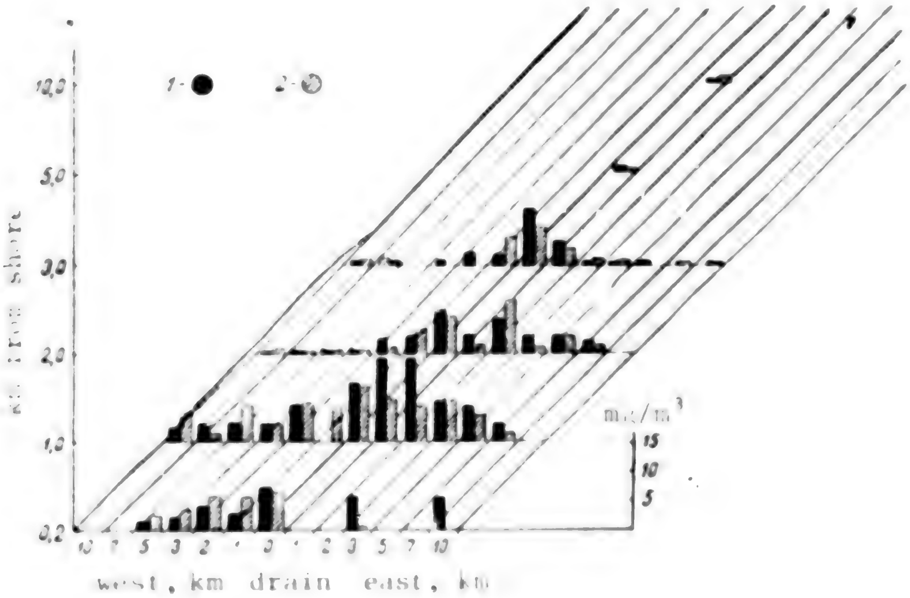


Figure 4. Potential first-phase nitrification in the region of industrial waste dumping. Designations are the same as in Figure 3.

[illegible] potential phase-2 nitrification, we can mention its local nature, but the level of such nitrification increases to the east of the dumping site of industrial waste. Thus, in 1979, in samples collected at the dumping channel it constituted 80 mg/m^3 and 5 km to the west 25-40 mg/m^3. At a distance of 10 km, in the pelagic zone of the lake, potential nitrification held at a rather high level.

In March of 1980, the magnitude of potential phase-2 nitrification reached [illegible] mg/m^3 opposite the industrial waste dumping site on the surface and 95 mg/m^3 nitrates at a depth of 25 m. In a clean area, the levels changed from 31 to [illegible] mg/m^3. In July, there was a decline of potential second-phase nitrification. Even in the region of industrial waste dumping, it did not exceed 95 mg/m^3 at 25 m and 83 mg/m^3 on the surface, versus 5-31 mg/m^3 in the control.

We were impressed by the relatively large number of anaerobic nitrogen-fixing microorganisms in 1979. They constituted a maximum of 200 cells/ℓ. The distribution of this group of bacteria is extremely uneven, although there is a tendency toward decline as the distance increases from the dumping site. At [illegible] km east of the drainage point, there are no microorganisms of this group at all.

In March 1980, the quantity of anaerobic nitrogen-fixing bacteria was generally smaller than the previous year--67 cells/ℓ. We failed to observe an overt tendency toward decline in number of anaerobic nitrogen-fixing bacteria with increase in distance from the dumping site, but there were more at a depth of 25 m than in samples taken from the surface. These bacteria were not demonstrable in 46% of the samples. One could observe a high intensity of anerobic nitrogen fixing, up to 60%, in samples collected opposite the dumping site, at a depth of 37 m, and 50 m east of the dumping site at a depth of 25 m. In a region of clean water, the intensity of anaerobic nitrogen fixing was low--10-20%.

In June 1980, no anaerobic nitrogen-fixing bacteria were demonstrable in 63% of the tested samples, although their maximum number reached 100 cells/ℓ. The distribution of these microorganisms, both horizontally and with increase in distance from dumping sites, was even more uneven in July than in March, which could be due to mixing of water masses during storms. Opposite the liquid waste drainage point, their number did not exceed 50 cells/ℓ, whereas with increase in distance from this point it reached 75-100 cells/ℓ.

On the whole, the investigation of distribution of nitrogen cycle bacteria in water revealed that there is marked variation in number of each individual group of microorganisms, as well as in activity of processes. However, we did observe a general tendency toward decrease in number of ammonifying bacteria and anaerobic nitrogen-fixing bacteria, as well as decline of potential nitrification as the distance increased from the combine's waste dumping site.

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PROBLEMS OF SOIL RECULTIVATION IN KAZAKHSTAN

Alma-Ata IZVESTIYA AKADEMII NAUK KAZAKHSKOY SSR: SERIYA BIOLOGICHESKAYA in Russian No 3, May-Jun 82 pp 60-66

[Article* by Ye. U. Dzhamalbekov, "Order of Red Banner of Labor" Institute of Soil Science, Kazakh Academy of Sciences, Alma-Ata]

[Text] The ground cover of earth is disrupted during exploration, recovery and concentration [enrichment] of minerals. This article discusses problems of restoring fertility of impaired soil. The results of the first experiments in this direction are submitted.

In recent times, much is being said about environmental protection, and this is not by chance. It is our profound conviction that environmental protection should begin expressly with protection of earth, because the condition of the plant and animal kingdom, as well as the welfare of man himself, depend on soil fertility and wise use thereof. Environmental protection cannot be reduced solely to protection of some unique species of plants and animals, entering them in the "Red Book" and publishing articles or monographs about them. We are amazed at the lack of attention given to the ground, to its soil cover, the foundation of life, where these unique representatives of the flora and fauna grow and live. In one of his first addresses to the people of liberated Russia, V. I. Lenin stated: "Take care of and cherish the land, like the apple of your eye...." [1].

The great Russian scientist and founder of soil science, V. V. Dokuchayev included man's productive activity among the six factors of soil formation affecting fertility, along with the maternal soil-forming rock, climate, topography, organisms and age of the land [2]. At the present time, in this era of scientific and technological revolution, the human factor of soil formation is of deciding significance. Human society, adding millions of tons of organic and mineral fertilizers annuallv to soil, irrigating vast areas of arid territories, is transforming the nature of this soil, increasing its productivity by several times.

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*Submitted to a meeting of the office of the Department of Biological Sciences, Kazakh Academy of Sciences, on 19 January 1982.

However, mankind requires not only agricultural products, but a developed industry, and since many minerals lie deep in earth, the soil cover is impaired when exploring for them, recovering and concentrating them. By digging up the earth and distributing recovered minerals over the surface of the globe, man performs the function of a mighty geological and geochemical force.

It should also be noted that, because of growth in recovery of minerals, there is also growth from year to year in volume of processed mineral raw material and rock extracted from earth's crust. Thus, while an average of 20 tons of different minerals and rock were extracted for every inhabitant of our planet in the late 1960's, at the present time the figure is about 30 tons. However, only 2% of the recovered minerals are converted into useful products, whereas the rest is returned to nature, often in such a form that natural forces are unable to include this waste in their cycle [3]. This includes abandoned quarries, dumps of stripped and empty rocks, tailings dumps of concentration factories, ash dumps, slag from TETs, garbage and industrial waste. In many instances, they are useless and sometimes toxic, taking up a considerable area of formerly productive lands; these land regions, in which there is no vegetation for a long time, are subject to intensive erosion, they worsen the sanitary condition of the environment and cause significant detriment to human health.

Thus, according to incomplete data for our country, there are about 2 million ha of impaired land, whereas in Kazakhstan the area is about 200,000 ha, 100,000 ha of which were worked on long ago.

It is known that the land resources of the world are rather limited, and the potential productivity of the globe's land, which could be tilled, constitutes 23-25% of the land, or about 3200 million ha, as established at the 10th International Congress of Soil Scientists in Moscow [4].

At the present time, 4.5 billion people make use of about 1.5 billion ha of cultivated land, i.e., there is only 0.34 ha cultivated land per person with average grain crop yield of 15 q/ha. But mankind is growing at a rather rapid pace and, according to the estimates of scientists, by the year 2000 there will be 6.5 billion people on earth. In order to feed the planet's population (with consideration of the many people who are starving in the present world), land productivity must be doubled by 2000, by means of increasing the area cultivated and increasing the yield of crops on utilized land.

With regard to the land resources, the USSR as a whole and Kazakhstan in particular are in a rather advantageous position. At the present time there is 0.85 ha land per capita in the USSR and 2.4 ha cultivated land in Kazakhstan. According to this indicator, Kazakhstan is in first place in the world. However, it can be stated with confidence that no considerable areas of unused land remain in all nations of the world, including the USSR, that would be developed without ameliorative measures and large capital investments. Under existing circumstances, when a shortage of tillable land is already being experienced in many corners of the globe, whereas in the foreseeable future there will be a shortage of cultivated land everywhere, mankind should definitely not be allowed to further plunder the land resources.

Since the process of formation of a humus layer 1 cm thick lasts tens and hudreds of years, our immediate offspring will inherit from us enormous wastelands. For this reason, it is imperative to take steps, even now, to prevent these sad consequences.

Usually, recultivation is used to refer to restoration of impaired land in order to use it for agriculture, development of large green areas, recreation zones, fish-farming reservoirs, industrial and civilian construction. It is necessary to conduct such work at the present time, and there are provisions for it in the land legislation of the USSR and Union republics. Thus, article No 35 of the Land Code of Kazakh SSR states: "Enterprises, organizations and institutions that are developing the sources of minerals, that are conducting geological exploratory, construction and other work, are compelled to restore at their own expense the land, after completion of use thereof, to a condition that is suitable for agriculture or use in other sectors of the national economy" [5]. According to the same legislation, enterprises that disrupt the earth's soil cover must remove and store the fertile layers enriched with humus before they undertake their work, so that they can be used upon subsequent recultivation.

However, as indicated by the data of the Land Management Service of the Kazakh Ministry of Agriculture, these requirements are very often not fulfilled, while those who disobey land legislation remain unpunished. As reported by Comrade F. I. Mamychev, head of the Main Administration of Land Management and Soil Protection of the Kazakh Ministry of Agriculture, to a meeting of the Presidium of the Central Council of the Kazakh Environmental Protection Society (21 September 1979), 56 cases of malicious infraction of the land laws of Kazakhstan were submitted in recent years to bodies of the Kazakh procuratorship. However, no criminal proceedings were instituted for any of the cases.

It is unforgivable when, before starting any construction jobs, one "forgets" to remove and store valuable superficial soil layers for future recultivation of the [illegible] disturbed land. As a result, the riches created over centuries by nature, which, in the words of V. V. Dokuchayev "are dearer than any oil, coal, dearer than gold and iron ore" [6], remain under a strip of road or in a dam.

Recultivation should restore the former condition of the soil cover, otherwise the soil cannot be suitable for agricultural use.

The need to recultivate is also prompted by the fact that, as the area of disturbed landscapes with a "nonworking" surface increases, there is severe disruption of oxygen conditions in the biosphere, in the direction of a decrease in oxygen level. Under modern conditions, when the technosphere consumes about 15 times more oxygen than all life on earth, this is extremely undesirable. In the United States, for example, more than 100 million motor vehicles consume twice as much oxygen than is produced there by vegetation [7].

However, the term, "recultivation," should be interpreted much more broadly than the mere restoration of soil on disturbed land. It should be noted that the word, "restoration," definitely reflects only one aspect of recultivation. Recultivation virtually never achieves ideal restoration of former soil, because it was formed over thousands of years under conditions that have long since disappeared and will not be repeated. Moreover, we are convinced that not only territories disturbed due to mining, but those in their natural state, which cannot be used for agriculture, greenbelts or other purposes, although a need arises very often to use them in this way, should be subject to recultivation.

Professor N. I. Gorbunov [8] includes bedrock raised by tectonic forces among targets of recultivation. In our opinion, the following should also be included: large areas of thin soil with adjacent sublayer of hard rock, regions with a well-developed gully and ravine system, rocky areas with exposed hard rock, as well as regions relatively recently filled in [previously under water]. This is expressly what we encountered in exploring the soil of Mangyshlak Peninsula, where there are mainly thin, nutrient-deficient soils with adjacent sublayers of bedrock, consisting of Sarmatian limestone that is frequently found on the surface. There are also regions recently exposed by the receding sea, where soil as such is virtually wanting. In view of the appearance of large cities, one has to perform landscaping work in such regions and, occasionally, submit the land to agricultural development. In their natural state, these regions are, of course, unsuitable for landscaping and agriculture; for this reason, one has to radically alter the nature of these landforms by means of artificial build-up of the ground by means of bringing it in from other regions (so-called vertical planning), or else make pits, or caverns, in bedrock to plant trees and trenches for shrubbery, also filling them with brought-in ground.

We consider these types of work to be recultivation, rather than amelioration. Amelioration means improvement, and it is usually achieved by means of irrigation, drainage, use of chemistry, etc. In the above-mentioned cases, however, when there is virtually no soil as such, one has to radically alter these regions by means of engineering, with artificial creation of a ground layer. These types of work are a variant of recultivation work, or else it could be called engineering soil science.

All of the main industrial cities in Mangyshlak (Shevchenko, Novaya Uzen) and worker settlements (Yeraliyevo, Zhetybay) are landscaped by means of such unique land recultivation. Some problems related to landscaping the peninsula have not yet been solved, and they are presently being worked on at the newly organized experimental Botanical Garden of the KaSSR Academy of Sciences in Shevchenko. Nevertheless, thanks to the efforts and research of scientists at the KaSSR and Leningrad Institute of Complex Planning, a modern civilization is emerging here, under extremely difficult soil and climate conditions that were considered, until recently, to be unsuitable for settled life.

Karaganda is another target for recultivation in Kazakhstan, where restoration work began in the late 1960's. At the present time, considerable advances have been made there in the area of clearing urban land of waste from the mining industry.

Everyone knows that pyramid-shaped rock dumps are a typical feature of industrial mining cities. In the Donets Basin, for example, more than 1000 dumps take up over 8000 ha of valuable agricultural land and, to this, we should add about 40,000 ha of so-called health [sanitary] zone around them. In Karaganda, there were more than 100 such dumps until recently, and together with the health zone they occupied more than 7000 ha. Many such dumps, which contain burning coals, are ignited spontaneously, discharging into the air carbon monoxide, sulfur dioxide and phosphorus fumes, thereby considerably deteriorating the sanitary condition of the city and suburbs. At night, burning dumps resemble active volcanoes.

In recent years, a decisive war was declared in Karaganda against rock dumps. Hundreds of thousands of cubic meters of rock raised to the surface for decades have been hauled to the lowlands, used for construction of roads and railroad embankments. In their place, an artificial soil cover (imported) was created, grass, flowers, trees and shrubs have been planted. Such landscape transformations have been made in the former dumping regions of the Kostenko, Karagandinskaya and other mines.

With recultivation in Kazakhstan, we encounter mainly old quarries and terraces, where the fertile soil layers had not been removed or stored before commencing geological work. It is not easy to recultivate such areas. They are often covered with loose, potentially fertile ground which does not yield particularly good results. Still, the situation is more or less correctable in regions where, in spite of the absence of fertile-soil layers, there is a sufficient amount of loose, nontoxic ground, such as loess [wind-blown silt], loess-like loam and other fine-earth ["melkozem"] deposits, which are potentially fertile and can be readily recultivated after use of a number of agrochemical and agrobiological measures. However, one also encounters rather often in Kazakhstan regions where there is a considerable shortage not only of fertile-soil humus layers, but loose fine-earth potentially fertile ground. There are many such areas in Mangyshlak Peninsula and North Kazakhstan Oblast. Thus, stripped quarries and terraces of the Leningorskiy and Zyryanovskiy complex ore combines consist mainly of coarsely fragmental and, occasionally, toxic hard rock. In such cases, recultivation is a rather difficult task.

In recent years, we (Institute of Soil Science, KaSSR Academy of Sciences) conducted some theoretical and experimental research work to validate plans for recultivation in Kazakhstan. At the present time, a comparative evaluation is being made of the degree of fertility of different levels (A, B, C) of the main soils in the vertical profile of the Zailiyskiy Alatau-Kapchagay reservoir in the section on the foundation of our institute (village of Kuram), which covers the area from the chernozem of the mountain-steppe belt to the takyr-like [clay-surfaced desert soil] soil of the desert near Balkhash. Our objective was to determine the extent to which fertility of levels B and C is lower than that of level A, and how one could bring the fertility of these levels up to that of A.

The study was conducted with selected samples from A, B and C levels of the main soils placed in containers: mountain chernozem, low-land chestnut brown soil, gray desert soil [serozem] of the foothills and takyr-like soil of the Kur-Chilik River valley. The experiment was performed in four variants, with four replicas, with three levels of all soils and two crops, barley and soybeans.

As a result of 3-year studies, it was found that, on the average, fertility of B levels constitutes 58-60% of that of level A and fertility of the C level constitutes 25-34% of the latter.

Fertility of B and C levels could be brought up to that of level A, or even higher than the latter by using complete fertilization. However, the efficacy of fertilizers is evident only for the first 2 years.

The aggregate of work referable to soil recultivation can be divided into two phases: mining and biological (agricultural) recultivation. The former refers to separate treatment and storage of the fertile soil layer, paving roads on terraces [or dumps], flattening the slopes of terraces and edges of quarries, planing the surface, covering the region to be restored with a layer of fertile soil or potentially fertile ground, installation of a drainage system when necessary. Biological recultivation includes a set of measures to restore fertility of recultivated lands and return them for use in agriculture or forestry. At first, "master" [assimilation, development?] plants are sown or planted in these regions, which must enrich the soil with nutrients in the course of vegetation. This is very important, particularly for regions where there is no fertile layer or it is not thick enough. Such regions require application of large doses of fertilizers. As a rule, leguminous grasses (sweet clover, alfalfa, sainfoin) serve as such master plants, since rock contains a certain amount of phosphorus and potassium and virtually no nitrogen, whereas legumes, as we know, enrich the soil (rock) with nitrogen as a result of assimilating it from the air and with organic matter due to their well-developed roots and above-ground masses.

Since the late 1970's, we started experimental research work in southern and eastern Kazakhstan in order to find the optimum methods of biological recultivation of disturbed land. Thus, in Chimkent Oblast, such work is being done on a stripped quarry of loess-like loam of the brick and cement plants, in East Kazakhstan Oblast on the coarse fragmental dumps of a mixed-ore combine. In eastern Kazakhstan, such work is being done in close contact with the Main Botanical Garden of KaSSR Academy of Sciences.

The preliminary results of the studies in Chimkent Oblast revealed that the loess-like loam in southern Kazakhstan can be readily recultivated, even without covering it with fertile-soil layers, with irrigation, use of fertilizers and cultivation of perennial master-plant legumes. Of all fertilizers, manure yields the best results. Legumes, particularly alfalfa, grow well, even in unfertilized conditions.

The studies begun in East Kazakhstan Oblast have shown that, since the dumps there consist mainly of coarse fragmental hard rock, a substrate of fertile-soil or potentially fertile layers of ground with good water, physical and chemical properties must be provided there in order to grow plants.

If the dumps [terraces] consist of toxic ground, a shielding layer of 0.4-0.[illegible] (crushed stone, pebbles) must be applied, then humus or potentially fertile ground.

As shown by the experience of the Kazmekhanobr [Kazakh Scientific Research and Planning Institute for the Mechanical Processing of Minerals] with regard to fastening tailings dumps, rather good results are obtained with application of a fertile soil layer only 20 and even 5-10 cm thick to "prime" the ground. This opens up vast prospects in the sense of economical outlay of fertile soil layers and reducing the cost of recultivation work [9].

The obtained data are preliminary, and they require verification in each specific soil-climate zone of this republic.

The Tselinograd Department of the Institute of Soil Science, KaSSR, is conducting considerable work to evaluate stripped ground in order to selectively remove and store it for subsequent recultivation at the sites of mineral deposits being currently developed in Central and North Kazakhstan.

Long ago, an experimental methodological group was formed under the Ministry of the Building Material Industry of KaSSR for recultivation of land, which is engaged in preparing plans for recultivation to be implemented by organizations under the jurisdiction of this ministry. The Ministry of Agriculture, KaSSR, has made an inventory of all disturbed land in the republic along the line of Kazgiprozem [Kazakh State Institute for Land Management Planning?] and its oblast branches. In the last few years, by contractual agreement with the KaSSR Academy of Sciences, the Ministry of Nonferrous Metallurgy has been conducting experimental research in eastern Kazakhstan.

In spite of the fact that some advances have been made in this area, many ministries and agencies continue to disturb the earth's soil cover and do not implement recultivation requirements. This is causing great alarm. The recultivation work begun in Kazakhstan is still episodic, it is not coordinated by anyone, there is no coordination of programs and methods used by different organizations and agencies. Thus far, there is no special financing for scientific research pertaining to land recultivation. For this reason, no systematic [planned] scientific research on land recultivation in the zonal aspect is being conducted in Kazakhstan. The plans for recultivation of disturbed land prepared by some institutions do not have adequate scientific foundation, since they were prepared without experimental data obtained under specific soil and climate conditions. Scientific practical experiments in different soil and natural zones of Kazakhstan are necessary for scientifically substantiated recultivation, in order to determine the optimum thickness of applied fertile soil or potentially fertile layers, master crops, dosage of organic and mineral fertilizers, agrotechnical questions, irrigation, etc.

For work on the above problems, there must be participation of the scientific institutions of the KaSSR Academy of Sciences and Eastern Department of the All-Union Academy of Agricultural Sciences imeni Lenin, which have not participated thus far fully in this matter, mainly due to lack of financing of such work. The time is ripe to raise the question of organizing a scientific production center which would prepare and implement recultivation plans. In our opinion, it would be expedient to organize such a center within the system of the KaSSR Ministry of Agriculture, which has the equipment, motor vehicle and tractor fleets in all oblasts and rayons of this republic. The KaSSR Academy of Sciences and Eastern Department of the All-Union Academy of Agricultural Sciences imeni Lenin could render scientific and methodological assistance to them.

The Academy of Sciences, in particular the Institute of Soil Science KaSSR and Main Botanical Garden, must develop theoretical research dealing with recultivation and commercial botany. In this respect, there has already been collaboration of these institutions on Mangyshlak Peninsula and in Rudnyy Altay.

Unlike other production resources (machines, lathes, etc.), land has one exceptional property. All machines and lathes wear out in the course of operation and are gradually removed from industry. Land, not only does not wear out, if treated properly, but, on the contrary, improves. And we should make use of this property of earth in order to constantly increase its fertility, and we should treat it with care.

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SVALBARD ANIMAL SPECIES ENDANGERED AS CIVILIZATION ENCROACHES

Helsinki SUOMEN KUVALEHTI in Finnish 13 Aug 82 pp 12-13

[Article: "The Last Musk Ox"]

[Text] A lone musk ox assumes a defensive position against intruders. Behind the ox is a mountain wall and to the side a gulley, in the depths of which one can hear a rushing icy brook. The ox puts his head down, paws the ground, and snorts. Then suddenly runs away. We have seen perhaps the last musk ox on Svalbard. Estimates of the remaining strength of the herd fluctuate from one to three animals.

An Italian researcher visiting the Svalbard museum is the first to tell about a musk ox, which he saw in the Bjorndalen valley. The curator of the museum confirms that there is one ox in the vicinity of Longyearbyen, another has been seen on the southern coast of Nordenskiold, and there have been rumors of a third ox among the animals living in the glacial valleys of the interior.

Later a helicopter pilot has said that there is only one musk ox.

Hiking along Bjorndalen we ran into two green camper's tents, whose Swedish owners stated that just yesterday the ox was near by, but it then moved into the interior.

A clotted, fuzzy wool is found from patches of moss in the valley. It must be from the musk ox! One tuft of wool after another encourages us to follow more and more paths deeper into the valley.

Finally, the photographer sees a grayish-brown spot standing out from a stone pit on the ridge of the mountain. We cross a winding brook at the bottom of the valley and begin to climb the ridge, in which tracks dug out by a heav animal are visible.

The wind is coming toward us and suddenly we find ourselves on a grassy plateau together with the musk ox. The arctic wind mercilessly blows at the remnants of the winter coat left on the neck of the ox, and the ox reminds one of an old gray lion.

The loneliness of the musk ox, a gregarious animal, is oppressive; another musk ox will never come to these vast mountains and arctic fields.

Even a quick retreat was in vain. Later we learned that the musk ox will attack uphill, not downhill. It is doubtful that this old man even had any malicious intentions. Perhaps he had only a friendly curiosity in mind.

No definite explanation has been found for the rapid disappearance of musk ox on Svalbard. A herd of 17 calves was brought from Greenland in 1929 and it increased initially so that in the beginning of the 1960's 60-70 animals moved about the valleys. However, in 1974 only 30 animals were left, in 1978 20, and a recent Norwegian report states briefly that "the herd is becoming extinct".

According to one estimation the repeated wet snow and sleet over a period of several winters may have dampened the coats of the calves and the animals died from the cold. Older animals, on the other hand, were not able to forage for food under the layer of ice. According to another theory the musk ox were no longer able to compete for nourishment with the growing reindeer population.

Polar Bears Dangerous

In the postwar years the reindeer herd amounted to an unassuming number of 400-500 animals. However, complete protection and the shooting of dogs that escaped from the Russian mining camps have allowed the reindeer herd to increase at a rapid rate. Now the herd numbers 9,000 and reindeer walk about the center of Longyearbyen and along the edge of the airport.

An addition to the musk ox and reindeer, the mammal population on Svalbard is limited to Arctic fox and polar bear. The experiment in acclimatizing polar rabbits from Greeland failed. These quick moving animals scampered to the four winds and were not able to find each other in the spring even when the urge to mate arose.

Artic foxes can be seen slinking around the piles of coal in the harbor even though they are said to be timid and cautious. The foxes are pursued by only two commercial Norwegian fur trappers.

The only place a summer camper will see a polar bear on Svalbard is on warning posters attached to garbage cans in Longyearbyen: "It will attack without warning".

The governor's office distributes instructions in which campers are requested to leave waste within view 100 meters away from the tent opening. The instructions begin: "Be silent when the bear approaches. Keep a weapon ready, but secured." Those who are unarmed, on the other hand, have nothing else to do but throw down caps, boots, and so on in the path of the oncoming bear. The bear's pace will be slowed down as he stops to sniff the items.

Fortunately, for the tourists in the summer the majority of the bears withdraw to the edge of solid ice and to the north along with the seals. However, the few hungry animals remaining behind are even more irritable.

"We have considered the resumption of bear hunting. Now the bears are protected by international treaty, as a result of which the number of bears increases by 100 animals annually," estimates Governor Carl Wendt and assures us that the danger of bears is real: "Most recently a couple years ago a bear ate an Austrian tourist".

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